

Appl. No.: 10/014,337
Amdt. dated Aug. 19, 2005
Reply to Office Action of May 20, 2005

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II. Remarks In Response to the Office Action

A. General Remarks

Claims 1-48 are pending in the application.

B. Claim Rejections - 35 USC § 101

In the Office Action, claims 17-32 stand rejected under 35 U.S.C. § 101 because they reference a "carrier medium." In response, Assignee has amended claims 17-23 to reference a "programmable storage device." Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

C. Claim Rejections - 35 USC § 112

In the Office Action, claims 1-13, 15, and 17-48 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Assignee respectfully requests that the Examiner reconsider and withdraw the rejections in light of the following:

(a) In general, many of the § 112 rejections in the Office Action appear to desire an exactitude that is not required by 35 U.S.C. § 112, which only requires that one of ordinary skill in the art understand what is meant. Accordingly, Assignee contends that those § 112 rejections requesting what is not required by statute are improper, and Assignee respectfully requests reconsideration and withdrawal of the rejections.

(b) With respect to claim 1, lines 6-7, the Office Action states that "*it is not clear what are 'the plurality of system performance metrics' in the log of resource usage with respect to resources consumed by the processes. (i.e. what are the metrics and how do they relate the processes and/or to the transactions?)*." Assignee respectfully disagrees with the contention that "the plurality of system performance metrics" is indefinite. Claim 1 defines that the system performance metrics reflect "consumption of the resources by one or more of the processes that performed the transactions." Illustrative examples of metrics as measurement of a particular system resource include, but are not limited to, CPU, disk I/O, file system usage, database usage,

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threads, processes, kernel, registry, logical volumes, and paging, as described in the specification at page 11, lines 6-9.

(c) With respect to claim 1, line 8, the Office Action states that *"it is uncertain how the timestamps in the log of transactions are 'compared' to the time periods in the log of resource usage. (i.e. in what way are these times and time periods being compared to each with respect to the log of transactions and the log of resource usage?)"* Assignee respectfully disagrees with the contention that claim 1 at line 8 is indefinite. Claim 1 defines that the log of transactions has transactions and timestamps for each transaction and that the log of resource usage has periods of time of resource usage and system performance metrics for these time periods. Nevertheless, Assignee has clarified in claim 1 that the timestamps are compared to the periods of time to determine timestamps corresponding to the periods of time.

(d) With respect to claim 1, line 10, the Office Action states that *"it is unclear what is the determining factor or what is the criteria for determining what transactions used what resources based on comparing timestamps in the log of transactions to periods of time in log of resource usage. (i.e. is there some set scale to compare against or value that has to be met in order to relate a transaction to a resource used?)"* Assignee respectfully disagrees with the contention that claim 1 at line 10 is indefinite. Claim 1 defines that the determination is made *"based on the comparison of the timestamps in the log of transactions to the periods of time in the log of resource usage."*

(e) With respect to claim 2, line 4, the Office Action states that *"it is uncertain how a correlation coefficient is 'computed' based on transaction activities and resource usage. (i.e. is there a formula or another method that is used to determine the variable?)"* Assignee has clarified that the correlation coefficient is computed by computing a covariance between transaction activities and resource usage.

(f) With respect to claim 2, line 6, the Office Action states that *"it is uncertain how the correlation coefficient is 'analyzed' in regards to determining whether or not a resource was used by that transaction. (i.e. how is the correlation coefficient used when looking at whether or not a transaction is associated with a resource? Does this coefficient's value tell us whether or*

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not a transaction used a resource?)." Assignee has clarified that the correlation coefficient is analyzed whether the coefficient is at least greater than a desired correlation value.

(g) With respect to claim 5, line 2, the Office Action states that *"it is unclear how the performance of the computer system is "modeled" with respect to the workload. (i.e. is the computer system performance graphed or are physical displays used to show performance?)."* Assignee has clarified that modeling performance of the computer system using the workloads is done *"by correlating the transactions of the workloads to the resource usage utilized by the transactions of the workloads."*

(h) With respect to claim 13, line 2, the Office Action states that *"it is unclear how the method of determining which transaction used which resources is performed "automatically". (i.e. when attempting to make this determination of relationships between system resources to transactions how is the process automatic? Is there a machine that reviews the logs of resources and transactions that performs this operation?)."* Assignee has clarified that the determination is performed automatically by the computer system.

(i) With respect to claim 15, line 3, and claim 16, line 4, the Office Action states that *"it is uncertain as to how processes "correlate" to the system performance metrics when determining workload. (i.e. what associations are there between processes and sets of system performance metrics that allow us to group processes into workloads?)."* Assignee respectfully disagrees with the content that claim 15 and 16 are indefinite. Claim 14, from which claims 15 and 16 depends, defines that a correlation coefficient is determined for each of one or more pairs of system performance metric and transactions in the lists and that a supporting set of pairs of system performance metrics and transactions are determined whose correlation coefficients exceed a desired correlation value. A workload is determined using the supporting set, and the workload comprises a meaningful partition of transactions performed on the computer system. These transactions are performed by processes consuming resources. The system performance metrics reflect consumption of the resources by one or more of the processes that performed the transactions. Thus, the claims define that the correlation coefficient defined in claim 14 provides the association between processes and sets of system performance metrics that allows the processes to be grouped into workloads.

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(j) With respect to claims 17-48, Assignee addresses the rejections of claims 17-48 with arguments and amendments similar to those discussed previously and respectfully requests withdrawal of the rejection of claims 17-48.

D. Claim Rejections - 35 USC § 103

In the Office Action, claims 1-48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,761,091 ("Agrawal"). To render claims 1-48 obviousness, Agrawal must teach or suggest all the limitations of the claims. Assignee respectfully traverses the contention that Agrawal renders the listed claims 1-48 obvious in so far as Agrawal does not teach or suggest all of the limitations of independent claims 1, 14, 17, 30, and 46.

1. Relevant Case Law

As a preliminary matter, absent a teaching of a missing element, controlling Federal Circuit precedent establishes that an obviousness rejection based on a single reference fails on its face. Specifically, the Federal Circuit has held that one can only "rarely" rely on skill of the art to supply a missing element in a section 103 rejection:

VSI argues that it would have been obvious to one of ordinary skill in the art to punch a hole in a cantilevered support. VSI is unable, however, to point to any specific teaching or suggestion for making this combination. VSI instead relies on what it presumes is the level of knowledge of one of ordinary skill in the art at the time of the invention to supply the missing suggestion to combine. In the first place, the level of skill in the art is a prism or lens through which a judge or jury views the prior art and the claimed invention. This reference point prevents these deciders from using their own insight or, worse yet, hindsight, to gauge obviousness. Rarely, however, will the skill in the art component operate to supply missing knowledge or prior art to reach an obviousness judgment. See *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. (BNA) 303, 312-313 (Fed. Cir. 1983) ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against

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its teacher.”) **Skill in the art does not act as a bridge over gaps in substantive presentation of an obviousness case**, but instead supplies the primary guarantee of objectivity in the process. *See Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718, 21 U.S.P.Q.2d (BNA) 1053, 1057 (Fed. Cir. 1991).

All-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1324 (Fed. Cir. 1999) (emphasis added).

With this understanding, Agrawal fails to render claims 1-48 obvious.

2. The Agrawal Reference

Agrawal appears to disclose a technique for measuring CPU utilization for a machine running the UNIX operating system. As noted in Agrawal, UNIX “‘measures’ overall CPU utilization for the system and the processes by ‘sampling the CPU’ on every tick (typically every 10 milliseconds) to see if it is busy, and if so, by which process.” Col. 4: 55-59 & Figure 2. Apparently, when UNIX samples the CPU at every tick, the process that is making the CPU busy is directly determined in the sample.

The invention of Agrawal also “samples the data collected by UNIX in its kernel data structure” and does so “[w]ithout modifying the UNIX kernel.” Col. 5:15-17. Instead of sampling the CPU on every tick as done by UNIX, Agrawal discloses “periodically sampling the CPU(s) to determine whether idle or apparently busy, and if busy, with which process.” Col. 3:46-47. When it is observed that a process that was previously running is not running during a current sampling period, Agrawal discloses that information deposited with the parent structure of the operating system is used to increment the resource usage. *See* Agrawal at col. 5, line 57 to col. 6, line 8. Thus, the process is already known and the information in the parent structure is used to directly increment the resource usage for the terminated process. Thus, like UNIX, Agrawal appears to periodically sample a CPU to determine if it is busy and determine directly which process has made the CPU busy.

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3. Claims 1-13, 17-29, and 33-45

In contrast to Agrawal, claims 1-13, 17-29, and 33-45 are directed to characterizing a computer system having resources and processes. The processes consume the resources when performing transactions. In general, claims 1-13, 17-29, and 33-45 require that logs of transactions and resource usage be independently generated. Agrawal, on the other hand, samples a CPU and directly obtains which processes have made the CPU busy. Thus, Agrawal does not independently generate logs of transactions and resource usage for comparison.

In addition, Assignee's claims require that timestamps in the log of transactions are compared to periods of time in the log of resource usage to determine which timestamps correspond to the periods of time. Based on this comparison, a determination is made which transactions used which resources. Agrawal fails to teach or suggest using logs. Agrawal also fails to teach or suggest comparing time entries in logs to determine which transactions used which resources. Instead, Agrawal discloses sampling a CPU to obtain directly its utilization and the process that has made the CPU busy.

The Office Action cites Agrawal at col. 5, line 56 to col. 6, line 2 to support the contention that Agrawal compares times in a log of transactions to periods of time in a log of resource usage. However, Agrawal discloses that when a process that was previously running in a previous sample is not running in a current sample (*i.e.*, the terminated process is already known), information deposited with the parent structure of the operating system is used to increment the resource usage by the amount of the resources used by the process that just terminated. See Agrawal at col. 5, line 57 to col. 6, line 8. Thus, Agrawal does not disclose comparing time entries in independently generated logs of transactions and resources usage to determine which transaction used which resources. Instead, Agrawal discloses incrementing resource usage for a terminated process by directly using information in a parent structure of the operating system.

In short, Agrawal does not teach or suggest a log of transactions, a log of resource usage, comparing time entries in these logs, nor determining which transactions used which resources based on the comparison. Due to the stark contrasts between Assignee's claims 1-13, 17-29, and 33-45 and the disclosure of Agrawal and due to the failure of Agrawal to disclose or even suggest

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limitations of Assignee's claims, Agrawal cannot render Assignee's claims 1-13, 17-29, and 33-45 obvious based solely on a motivation by one skilled in the art to modify Agrawal. Therefore, Assignee believes that claims 1-13, 17-29, and 33-45 are in proper form for allowance and respectfully request that the Examiner indicate the allowance of these claims in the next paper from the Office.

4. Claims 14-16, 30-32, and 46-48

In contrast to Agrawal, claims 14-16, 30-32, and 46-48 are directed to characterizing a computer system having resources and processes. A list of transactions performed on the computer system is determined over a time interval. Also, a list of system performance metrics for the computer system is determined over the time interval. The system performance metrics reflect consumption of the resources by one or more of the processes that performed the transactions. A correlation coefficient is determined for each of one or more pairs of system performance metric and transactions, and a supporting set of pairs of system performance metrics and transactions is determined whose correlation coefficients exceed a desired correlation value. In addition, a workload using the supporting set is determined, where the workload comprises a meaningful partition of transactions performed on the computer system.

Agrawal fails to teach or suggest the limitations of Assignee's claims. In particular, Agrawal fails to determine lists of transactions and system performance metrics and fails to teach or suggest that such lists and metrics be correlated. Instead, Agrawal discloses sampling a CPU to obtain directly its utilization and the process that has made the CPU busy.

In addition, Agrawal does not teach or suggest determining a correlation coefficient between transactions and resource usage nor determining if such a coefficient exceeds a desired value. With respect to the correlation coefficient, the Office Action in paragraph 22 appears to infer that the "capture ratio" disclosed in Agrawal is analogous to the "correlation coefficient" required in Assignee's claims. Assignee disagrees with such an inference for the following reasons.

As disclosed in Agrawal, the "capture ratio" is the ratio of (B) total resources used by processes divided by (A) total resource use system wide. Agrawal discloses that the method

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"generally results in a process capture being equal to 1.0." col. 6: 36-37. Thus, the "capture ratio" of Agrawal is an indication of whether the method has obtained data on the resources of all processes for the entire system, where a capture ratio of 1.0 means 100% of the data has been captured. This "capture ratio" is not a correlation coefficient between transactions and system performance metrics based on a comparison of time entries in independently generated lists of transactions and resource usage. Rather, the "capture ratio" of Agrawal reflects how much of all the system wide information has been captured by Agrawal's method. It will be recognized that a correlation coefficient is generally taken to be a statistic that describes the strength of the linear relationship between two variables. At no time does Agrawal describe or suggest that his "capture ratio" is a correlation coefficient.

In paragraph 23, the Office Action acknowledges that "Agrawal fails to teach determining a supporting set of pairs of system performance metrics and transactions whose correlation coefficients exceed a desired value." The Office Action goes on to conclude that such a limitation would be obvious. Assignee disagrees with this conclusion for the following reasons. First, as noted above, Agrawal's "capture ratio" is not a correlation coefficient required in Assignee's claims. Second, the "capture ratio" of Agrawal is used to correct "per consumer information" that does not match "system-wide data." See Agrawal at col. 6, line 59 to col. 7, line 3. For at least these reasons, the "capture ratio" of Agrawal is not used to determine a "group" of correlated system performance metrics and transactions that have been correlated to a desired level, as required in Assignee's claims. Rather, the "capture ratio" is used to show inconsistencies in the "per consumer information" and "system-wide data."

In addition, no basis is given upon which to make the assertion in the rejections. Established case law and Patent Office procedure requires that the Office Action identify where in Agrawal the motivation exists to make such a leap. Assignee asserts such motivation does not exist. If the Examiner contends that such a motivation does exist, Assignee respectfully requests that the Examiner indicate where in the cited references such a suggestion is found. If the Examiner is relying on personal knowledge that one of ordinary skill in the art would have combined the cited references as alleged, Assignee respectfully requests that the Examiner provide an Affidavit so stating in accordance with 37 C.F.R. 1.104(d)(2) and MPEP 2144.03.

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In paragraph 23, the Office Action also acknowledges that "Agrawal fails to teach "...using the supporting set to determine a workload which comprises a meaningful partition of transactions performed on the computer system." In contrast to Assignee's claims, Agrawal discloses that "process data is further grouped according to process name, full command name, user name and account name." Col. 6, lines 52-54. Thus, Agrawal groups process data based on "names." Grouping process data by "names" is not determining a "supporting set" of system performance metrics and transactions based on a correlation coefficient between them that exceeds a desired value, which is required in Assignee's claims.

Because the Office Action has failed to identify where Agrawal motivates the alteration of its disclosed embodiments to incorporate the admittedly missing claim elements, Assignee contends that rejection is based on hindsight reconstruction, which is a practice explicitly prohibited by Patent Office Examination Guidelines and the Federal Circuit. *See, e.g.*, MPEP 2141.01 and *In re Bond*, 910 F.2d 831, 834, 15 U.S.P.Q.2d 1566, 1568, *quoting Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 U.S.P.Q. (BNA) 644, 647 (Fed. Cir. 1986); *see also, e.g., In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d (BNA) 1071, 1073 (Fed. Cir. 1987) (reversing Board holding of obviousness); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 933 (Fed. Cir. 1987) (reversing district court holding of obviousness).

Because Agrawal does not disclose determining a correlation coefficient (which is not a "capture ratio" as disclosed) between system performance metrics and transactions nor determining a supporting set of pairs for such system performance metrics and transactions having a correlation coefficient exceeding a desired value, finding inconsistencies in data using a "capture ratio" and grouping data based on names as disclosed in Agrawal falls well short of rendering claims 14, 30, and 46 obvious to one skilled in the art. For at least these reasons, Assignee believes claims 14-16, 30-32, and 46-48 are not rendered obvious by Agrawal and respectfully requests allowance of these claims in the next paper from the Office.

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E. Authorization to Charge Fees

No fees are believed due at this time. The undersigned representative requests any extension of time that may be deemed necessary to further the prosecution of this application. Should any fees be due for any reason, the undersigned representative authorizes the Commissioner to charge any additional fees that may be required, or credit any overpayment, to Deposit Account No. 501922, referencing order no. 149-0044US.

To facilitate the resolution of any issues or questions presented by this paper, Assignee respectfully request that the Examiner directly contact the undersigned by phone to further the discussion, reconsideration, and allowance of the claims.

Respectfully submitted,

August 19, 2005
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